

**WHAT IS CLAIMED IS:**

1. A process of preparing a desired aliphatic fluorocarbon product comprising the following steps:
  - a) subjecting an aliphatic fluorocarbon starting compound to a treatment which will break at least one chemical bond of said aliphatic fluorocarbon starting compound to form a reactive aliphatic fluorocarbon intermediate compound;
  - b) reacting the reactive aliphatic fluorocarbon intermediate compound with another compound or another reactive intermediate to yield the desired aliphatic fluorocarbon product or an intermediate which will lead to the desired product and optionally to some undesired aliphatic fluorocarbon products;
  - c) separating said desired aliphatic fluorocarbon product from any undesired aliphatic fluorocarbon products; and
  - d) recycling any undesired aliphatic fluorocarbon products to step a).
2. A process according to claim 1, wherein the chemical bond of said aliphatic fluorocarbon starting compound is broken by pyrolyzing said aliphatic fluorocarbon starting compound.

3. A process for preparing trifluoroethylene, [TFE], in greater than 50% yield comprising pyrolyzing 1-chloro-2,2,2-trifluoroethane, [R 133a], at a temperature below about 725°C.

4. A process for preparing 1,1,1,3,3-pentafluoropropylene, [PFP], comprising pyrolyzing 1-chloro-2,2,2-trifluoroethane in the presence of chlorodifluoromethane at about 725-750°C.

5. A process for preparing 1,1,1,2,3,4,4,4-octafluoro-2-butene, [OFB], comprising pyrolyzing 1-chloro-1,2,2,2-tetrafluoroethane, [R 124].

6. A process for preparing 1-chloro-2,2-difluoroethylene, [CDFE] comprising pyrolyzing 1-chloro-2,2,2-trifluoroethane at about 700°C and at less than 10% conversion.

7. A process for preparing 1,1-dichloro-2,2-difluoroethylene, [DCDFE], comprising pyrolyzing 1-chloro-2,2,2-trifluoroethane in the presence of chlorodifluoromethane, [R 22], and hydrogen chloride.

8. A process for preparing 1,1,1,2,3,4,4,4-octafluoro-2-butene comprising pyrolyzing 1,1,2,2,2-pentafluoroethane, [R 125].

9. A process for preparing 1,2,2,2-tetrafluoroethane, [R 134a], comprising pyrolyzing 1,1,2,2,2,-pentafluoroethane.

10. A process for preparing 1,1-dichloro-1,2,2,2-tetrafluoroethane, [R 114a], comprising pyrolyzing 1-chloro-1,2,2,2-tetrafluoroethane.

11. A process for preparing perfluorobutane, [PFB], comprising pyrolyzing 1,1,2,2,2-pentafluoroethane.

12. A process for preparing 1,1,2,2,2-pentafluoroethane comprising pyrolyzing 1-chloro-2,2,2-trifluoroethane.